bring the so-called sportsman, and he brings death and destruction to the wild life wherever he goes. Then, too, we have some very nice specimens of shells to add to the collection, splendid souvenirs of our trip for many years to come, and after all that was the real reason for our adventure.

COLLECTING MOLLUSCA ON THE IRANIAN PLATEAU

BY H. E. J. BIGGS

Little has been written on the Mollusca of the Iranian Plateau. This was perhaps due to the inaccessibility of the interior in the past when the only method of traveling was by caravan. Now this is replaced by motor transport. On the other hand the old method of traveling was good for collecting. In 1922 I made a journey on mules from Ahwaz in the south-west, through Isfahan and Yezd, to Kerman. In more recent years I have traveled several times by lorry from Kerman to Isfahan, from Kerman to Bunder Abbas and from Kerman to Bushire *via* Sirjan and Shiraz. Several summer holidays have been spent in the mountains round Kerman and Yezd and the results may be of some interest.

Zoogeographically Iran lies within the Palaearctic Region. It is in the center of that great belt of deserts which extend from the Atlantic coast of Africa to the eastern side of China, and at the point of change from the hot desert area (Sahara and Arabia) to the temperate area (Turkestan). It also touches the Ethiopian Region on the south-west and the Oriental Region on the south-east. I have collected in the Caspian province of Gilan but its flora and fauna are distinct from those of the high arid plateau. Jagged barren mountain ranges separated by open stony plains covered with low scrub are the characteristic features of this area. Villages are few and far between, sometimes nestling in a mountain valley near a spring, sometimes isolated in the middle of a plain where a qanat (underground water-course) comes to the surface.

To the best of my knowledge the only systematic collecting done in our area was that of Count Doria of the Italian Mission,

and the results of his work were published by Issel in 1865, "Dei Molluschi raccolti della Missione Italiana in Persia." (Mem. Acc. R. Soc. Torino, Ser. 2. Tom. 23.)

My collecting may be divided into two types. Firstly, working systematically over a small area within reach of a camp or the town in which I have lived, and secondly, what one may call the "dash and grab" method used when traveling by lorry. A good illustration of the latter occurred on the road from Bushire to Shiraz. The strain of the ascent of the dangerous Dukhtar Pass was too much for the lorry and the radiator boiled, throwing the cap many yards and covering the machine with hot water. This delayed us some time and working at high speed in a few minutes I had turned a number of stones on the mountain side by the road and secured two or three species of Ena new to me.

In the former class of collecting comes the work I have been able to do round Kerman, a large town in the south, where I have been stationed for the past four years. The town lies on the edge of a plain near the mountains; the former is 5800 ft. and the latter rise another 1000 or more feet. This district has yielded several interesting species. In these mountains in March, 1932, I discovered a small *Cyclotus* which Herr Hans Schlesch of Copenhagen has described under the name *biggsi.* This species will fall into the new genus *Caspicyclotus,* erected by Dr. Lothar Forcart, of Basle, to accommodate *C. sieversi* Pfr. and *C. herzi* Bttg. The active life of *C. biggsi* during each year must be short. From February to March when the snows melt and lichens come to life on these bare mountains the species is active, but for the greater part of the year it remains firmly attached to the hippuritic limestone rocks sheltering from the heat of the sun in tiny cavities. In these same mountains, in rock crevices which support a scanty vegetation, *Granopupa granum* Drap. and *Pupilla signata* Mouss. are to be found together with other pupoid shells as yet undetermined. Further to the southeast of Kerman near Seguch, in similar situations but under slaty rocks, *Ena oxiana* Mts. var. *schahrudensis* Bttg. occurs in profusion.

In well-watered gardens in Kerman *Helicella millepunctata* Bttg. and *Vallonia adela* West. var. *mionecton* Bttg. are abundant, the former particularly so. The streams and qanats of

Kerman yield many species. *Melanopsis doriae* Issel, with its variety *nigra* Biggs. and a brown-banded variety are the commonest shells, followed closely by *Melanoides tuberculata* Müll. *Bythinella uzielliana* Issel is also fairly common. Kerman is the type locality for *M. dorias* and *B. uzielliana* as well as *Theodoxus doriae* Issel. Only one Pelecypod has turned up so far, *Pisidium casertanum* Poli, though *Corbicula fluminalis* Müll. is found in irrigation canals at Isfahan and I cannot understand why such a widely distributed species does not appear further south.

From Isfahan come *Chondrula bayeri* Pfr. and *Theba latonia* Bttg., both of which have not as yet been found further south in Iran. It seems quite unaccountable as conditions are favorable for both species, however, further search in some of the isolated places not yet visited may reveal them. *Succinia pfeifferi* Rossm. abounds in the willow beds by the Zehdeh Rud in Isfahan and it also occurs further north at Qohrud. Again this species has not appeared further south but a fossil *Succinea* found at Bam, 123 miles southeast of Kerman may be referred to this species.

Lymnaea truncatula Müll. has been found in almost all localities where collecting has been done, high up on the side of Shir Kuh at 10,500 ft. and in the warm palm gardens at Bam.

Southwest of Yezd and nestling in a long narrow valley lies the straggling village of Deh Bala. Its general direction is north and south, and the southern end lies between two great mountains Shir Kuh (13,370 ft.) and Barf-Khaneh (13,180 ft.). The sides of these mountains are scored with narrow valleys which in summer contain a mere trickle of water, but there is sufficient for small patches of grass to form at intervals down the valley, while all the rest of the valley is dry. These small spongy areas are good collecting places both for shells and beetles. Under stones in one of these places at about 9500 ft: I found large numbers of *Pupilla muscorum* Linn. and *Vitrina annularis* Stud. On the eastern slopes of Shir Kuh at 10,500 ft. three specimens of *Pisidium cinereum* Alder were found in water-logged ground, this being the highest point in Iran where I have collected mollusks. In a similar habitat, but down in the main valley at 9000 ft., a few slugs lived, this and one other locality near the Pir-i-Zan Pass west of Shiraz, were the only places where I have found

slugs. In the latter case they were living under the fallen leaves of *Quercus persica* J. et S.

In May, 1935, I had occasion to travel to Bushire on the Persian Gulf. Circumstances compelled me to take a very unfrequented road from Kerman to Shiraz *via* Sirjan. Machines pass over this road about once a month in fair weather and in the winter not at all, and the journey is hazardous. Owing to the lorry sinking axle-deep in the Saidabad salt marsh delaying me six hours, much of the journey which should have been by day had to be accomplished by night, and the whole journey was unproductive. However, at Bushire I found one species, *Jacosta tuberculosa* Conrad, in small groups firmly attached to the undersides of stones in the open ground between the British Residency at Sabzabad and the beach. They were in all stages of growth. The return journey to Kerman, which was made *via* Shiraz, Isfahan and Yezd, resulted in several fresh species added to my collection. The road from Bushire to Shiraz is, perhaps, the most dangerous road in constant use in the world. In many places it zigzags up the side of a mountain with no protecting walls. Here and there are drops of many hundred feet into ravines below. These stiff climbs, with the frequent halts to cool the engine, are most wearisome to an ordinary passenger but most welcome to the naturalist. At the bottom of the Dukhtar Pass a long delay gave me the chance to collect a few dead shells of a species new to me for Iran. Up on the pass I took *Ena* (*Petraeus*) *halepensis* Pfr. and two species as yet undetermined but very near the Palaearctic *H. caperata* Mont.

The road from Kerman to Bunder Abbas, the chief port on the south coast, lies through mountain and plain. From 5800 ft. at Kerman it rises and falls again and again till it reaches sea-level. The only locality of interest on this long road (some 360 miles) over which I have passed many times, is Hajjiabad Deraga. Here we are in the region of palms, and a river flows through the village bordered with Oleander and *Calotropis procera* R. Br. At intervals there are dense beds of reeds, but I have never been fortunate enough to have a breakdown near one of these. But at Hajjibad itself *Melanoides scabra* Müll. is found at certain times plentifully, at others not at all. This species

occurs in Seistan near the Afghan border, an Iranian friend having sent me several dead shells from that district. It does not appear further north than Hajjiabad.

Much work remains to be done in Iran. A fairly thorough search has been made at the places visited but the country is so vast and so difficult of access when off the beaten track that it may be some time before our knowledge of the geographical distribution of the species is known with any pretense at completeness.

Generalization would be premature but obviously the molluscan fauna of Iran is predominantly Palaearctic. Isolation tends to cause species to vary and I have a very interesting series of *Melanopsis* taken at various points on the road from Isfahan to Kerman, all varying so much that one would be tempted to put them into different species but for the fact that all intermediate types may be found, joining the small creamy smooth form to the large dark brown wrinkled form. Tentatively I place all these under *M. doriae* Issel. A problem is presented by the species from Aqda which conchologically appears to be near *praerosa* Linn., but if the anatomy could be studied it might prove to be a form of *doriae*. I doubt if typical *doriae* are to be found at Aqda at all. In view of the fact that each mountain mass has its own species of *Dyonisia* (Order Primulaceae) it would not be surprising to find that amongst this long series of sets of *Melanopsis* we have several different species.

Mollusca occur in most ponds and streams in Iran, but as each habitat is surrounded by miles of howling desert there can be little interbreeding, and when any catastrophe wipes out a habitat all the specimens occurring there must disappear. Such was the case in Kerman in July, 1932, when exceptionally heavy rains fell at a time when the ground was hard from months of drought. Floods occurred sweeping over the hard ground and precipitating an enormous quantity of water and loose earth into qanats completely filling them up. At Jelalabad, three miles west of Kerman, was a qanat in which *M. doriae, M. tuberculata* and *Lymnaea lagotis* were to be found in profusion. I visited this qanat shortly after the flood and found it filled with sand and quite dry. When I left Kerman in November, 1935, it had

not been repaired and numbers of dead shells could be seen in the sand. Should this watercourse ever be opened up will it be repopulated with these species, and whence will they come?

SOME MOLLUSCS FROM UTAH

BY S. T. BROOKS

In 1935 Mr. E. R. Eller, Assistant in the Section of Invertebrate Paleontology of the Carnegie Museum, spent some two months collecting recent mollusks and invertebrate fossils in the Uinta Basin, in and around Vernal, Uinta County, Utah. A study of this collection revealed a species and a subspecies new to science and added considerably to the collections of the Section of Recent Invertebrates. I wish, therefore, to acknowledge the efforts of Mr. Eller in behalf of this laboratory and wish to extend my appreciation to Dr. H. A. Pilsbry for his identification of the oreohelices and to Dr. F. C. Baker for his determination of the planorbids and lymnaeids.

1. *Oreohelix strigosa depressa* (Cockerell). Twelve miles north of Wellington. A large form measuring: diameter 26, altitude 14 mm. Salt Lake Meridian. Side Canyon at Dry Fork Canyon, "under rocks in a very dry locality," Range 20 East, Township 3 South, S. L. M. Brush Creek Canyon, R. 21 E, T. 1 S, S. L. M.

2. *Oreohelix subrudis* (Pfeiffer). Grouse Creek, thirty miles northeast of Vernal.

3. *Oreohelix* n. sp. This new species is in Dr. Pilsbry's hands for description. Hominy Creek near Whiterocks, R. 1 W, T. 2 N, Uinta Special Meridian.

4. *Retinella electrina* (Gould). Two and eight-tenths miles west of Vernal on Vernal-Lapoint Road, R. 21 E, T. 4 S, S. L. M. Two specimens, one albinistic.

5. *Euconulus fulvus alaskensis* (Pilsbry). Same locality.

6. *Euconulus fulvus* (Müller). Same locality.

7. *Vertigo elatior* Sterki. Same locality.

8. *Discus cronkhitei anthonyi* (Pilsbry). Same locality.

9. *Succinea avara* Say. Same locality.